The Canadian Entomologist.

LXXIV JUNE, 1942 No. 6

NEW RECORDS AND NOTES OF SALTATORIA (ORTHOPTERA) IN ONTARIO

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Oecanthus pini Beutenmuller. Since *O. pini* is known to range from Massachusetts west to Ohio and south to North Carolina, it is not surprising to find it in extreme southern Ontario. The specimens here recorded were found on white pine (*Pinus strobus* L.), red pine (*Pinus resinosa* Sol. and jack pine (*Pinus Banksiana* Lam.) in an area devoted to reforestation.

The sound produced by the stridulating males closely resembles that of *O. nigricornis*, but it is much softer and broken up into irregular stammering phrases. Our first attempt to trace the sound to its source proved fruitless. Hence, the specimens were taken by beating the lower branches of the trees with a stick, causing the crickets to fall into the open mouth of the insect net. In the short space of half an hour, sixteen specimens were obtained.

Turkey Point, Ontario, September 3, 1941. 9 ♂, 7 ♀.

Scudderia fasciata Beutenmuller. During the summer of 1939, while engaged in a faunal survey of eastern Ontario, a single specimen of a species of *Scudderia* was taken on white pine (*Pinus strobus* L.). Although the specimen was considered *furcata* at the time, we were somewhat in doubt (owing to the unusual fuscous markings on the tegmina, vivid red front femora, and decidedly more slender process of the last dorsal abdominal segment), and hence it was placed to one side for future consideration. Mr. Edward S. Thomas, Curator of Natural History at the Ohio State Museum, to whom the specimen was sent, has been considering the proper status of this species and has given the writer permission to state that his "studies indicate that *fasciata* is clearly a distinct species" and that he now has "a paper in preparation giving evidence to that effect". A comparison of the specimen here considered with specimens of *furcata* in our collection bears out Thomas' conclusion with which we agree.

Fasciata was first described by Beutenmuller in 1894 and was later made a subspecies of *furcata* by Scudder in 1898. Since then Blatchley has considered it a synonym of *furcata*, a conclusion which has been accepted by most orthopterists. In view of Mr. Thomas' publication, a description of the specimen of *fasciata* taken in Ontario as compared to *furcata* taken in the same locality is omitted.

Brockville, Ontario, August 10, 1939. 1 ♂.

Dendrotettix quercus Packard. While collecting at Turkey Point, Ontario, during the summer of 1940, three specimens of what proved to be *Dendrotettix quercus* were found on the leaf-strewn ground of a deciduous wood in which red oak (*Quercus borealis* Mich.) was the most abundant tree. Owing to the unusual colour of the specimens from this locality, they were at first considered distinct; Dr. Rehn, to whom specimens were sent, identified them as an unusual colour phase of *D. quercus* and drew our attention to Hebard's publication on

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the Dermaptera and Orthoptera of Illinois (Bull. Ill. Nat. Hist. Surv., 20:199) in which a similar colour phase is mentioned in connection with specimens from Missouri. Hebard concludes that "these differences may well be due to local environment", which would indicate the possible effect of some physical factor of local significance on coloration. It is the writer's belief, however, that such differences in colour are genetic and that it is unnecessary to resort to environmental factors for a plausible explanation. Both suggestions are made, of course, without experimental evidence. Since the coloration of the specimens from Turkey Point, Ontario, is distinct from the "normal" and does not fit the description given by authors (e.g. Blatchley) the following description is given.

Male. General colour light gray variously spotted with black. Head dark gray; antennae grayish-yellow at the base fading to light reddish-yellow towards the apex. Dorsum of pronotum light gray; median carina and transverse sulci black. Tegmina light gray; broadly rounded at the apex. Abdomen light gray above, light yellow beneath; pleura with a longitudinal black bar, broad at the base and tapering towards the apex of the abdomen. Outer face of hind femora light gray, with two distinct black cross-bars; knees black. Hind tibiae bluish-green, with a light gray ring near the base. Cerci and furcula as in typical specimens. Length of body, 19.5 mm.; of antennae, 11.5 mm.; of tegmina, 3 mm.; of hind femora, 11.2 mm.

Female. Similar in colour to the male, but with the following minor differences: Head light gray, variously marked with dark gray. Pleura of abdomen without a dark bar, light gray spotted with black. Length of body, 32 mm.; (antennae broken); of tegmina, 3.7 mm.; of hind femora, 14 mm.

Turkey Point, Ontario, August 25, 1940: 1 ♂, 2 ♀ (of which one specimen is now in the collection of the Academy of Natural Sciences of Philadelphia).

Schistocerca alutacea (Harris). Since this species occupies a very wide range, equal to that of *S. americana* (Drury), we have, for the past number of years, anticipated its occurrence in Ontario, at least in extreme southern Ontario along the north shore of Lake Erie. During the summer of 1940, Mr. G. H. Hammond of the Department of Agriculture, Ottawa, obtained a series of five specimens from Grand Bend, Ontario. At our request Mr. Hammond has submitted the following field data:

"The grasshopper *S. alutacea* was moderately common at Grand Bend on August 18, 1940. The site was sandy land about one mile from Lake Huron. The area was burned over five years previously. It is now covered with low open scrub consisting of birch, ash, oak, and poplar. In open areas a thin stand of fibrous rooted grasses was found, often with low climbers of various species. A population of 2000• *Arphia* was indicated here per acre. The *Schistocerca* grasshopper represented about 25 per acre. They invariably rose from foliage of scrub, and they flew at a height of about five feet and usually escaped by gliding through a dense mass of twigs, either alighting on a twig on the distant side or continuing on another 75 feet or so to disappear over the tops of massed scrub foliage. These grasshoppers were very difficult to catch on account of their prolonged flight, the method of hiding in deciduous foliage, and rapidity of take-off."

Four of the specimens, two males and two females, exhibit the strongly vittate phase and one specimen, a male, is unicolourous.

Grand Bend, Ontario, August 18, 1940: 3 ♂, 2 ♀; G. H. Hammond.

•*Arphia pseudonietana* (Thomas).

THE AMERICAN SPECIES OF *PHYTODECTA* KBY. (COLEOPTERA, CHRYSOMELIDAE) *

BY W. J. BROWN,

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Phytodecta Kby. is represented in the Western Hemisphere by four or five species which occur in Canada and in northern United States. The species are poorly represented in collections, and they have been confused with European species by most authors. They have been reviewed by Schaeffer (1924, Jour. New York Ent. Soc., XXXII, 138-140), but because the antennal and color characters used by Schaeffer fail and because the food plant records are incorrect, another synopsis seems desirable. One species described as North American, *simplex* (Suffr.) (1858, Ent. Zeit. Stettin, 383), is omitted from the following synopsis. It was said to have the anterior tibiae mutic, a character that will separate it from all the species discussed below. It has not been reported by other authors, and I suspect that its type specimen was of Old World origin.

European authors have divided the Old World species of *Phytodecta* into a number of subgenera. All of the American species known to me belong in *Phytodecta* s. str. which is characterized primarily by the form of the mandibles. The entire outer face of each mandible is occupied by a deep excavation that receives the apex of the maxillary palpus. In species of other subgenera, the mandible is feebly excavated. Like their European allies, the American species vary greatly in color. The variation is away from a standard pattern, each species differing in the direction or degree in which it varies. Moreover, there is evidence of geographic variation in color in two of the species, so color must be used with great care in separating species. One of our species, *arctica* Mann., is easily distinguished from the others but is very closely allied to the European species *nivosa* Suffr. and *affinis* Gyll.. Our other species are readily distinguished from their European allies†, and there is no reason at present to believe that any species of *Phytodecta* is common to Europe and North America. Our species, other than *arctica*, show slight differences in the form of the body, clypeus, and tarsi and in average color pattern, but they are distinguished readily only by characters of the male genitalia and, in the case of one species, by food plant.

In all of our species, the apical segment of the abdomen is a trifle more broadly truncate and the apical segment of each maxillary palpus is larger and more broadly truncate in the male than in the female. In all the median orifice occupies the full width of the aedeagus and is formed by the abrupt termination of the dorsal face of the latter. The internal sac bears no sclerotized parts other than a very slender flagellum which is from two-thirds to three-fourths as long as the aedeagus and which extends through the median orifice to the apex of the aedeagus where it is received in a groove between lobes of the latter. The flagellum is not shown in the accompanying figures.

The following key and notes are based on specimens in the Canadian National Collection and in the collection of Cornell University. I have seen type material of none of the species and am indebted to Dr. Henry Dietrich for the Cornell material which includes virtually topotypical specimens of *notmani* Schffr. and *americana* Schffr.

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†All of the European species of *Phytodecta* except *norvegica* Strand and *intermedia* Hellisen are represented in our collection. In my opinion, the aedeagus figured as that of *flavicornis* (Suffr.) by Weise (1886, Deutsche Ent. Zeit., pl. 1, fig. 40) is that of *kaufmanni* Mill.

KEY TO SPECIES

1. Tenth antennal segment distinctly longer than wide; the antennae attaining the posterior coxae in the male and the middle of the metasternum in the female. Males with the first segment of each front and middle tarsus a little wider than the third segment. Elytra often distinctly alutaceous and rather dull; the striae terminating on the humeral umbone more or less irregular at middle. Occurring on willow in the arctic and mountainous regions of the West ..... *arctica* Mann.

Tenth antennal segment not longer than wide; antennae similar in the sexes, not extending beyond the middle coxae. Tarsi never with the first segments wider than the third. Elytra never alutaceous, polished; the sublateral striae normally regular 2

2. Pronotum and elytra immaculate or with small black spots, the spots of the pronotum not extending onto the anterior half of the disk; individuals with maculate elytra having the clypeus black. Aedeagus attenuate apically, with a feeble notch at apex. Occurring on willow; New York and Quebec to Alberta ..... *notmani* Schffr.

Pronotum and elytra rarely immaculate (*americana*), the pronotal spots usually extending onto the anterior half of the disk; the clypeus always pale 3

3. Aedeagus short, the apex truncate and bilobed. A transcontinental species occurring on aspen poplar ..... *americana* Schffr.

Aedeagus attenuate apically, the apex deeply cleft. Occurring on willow in in the mountains of Alberta and British Columbia ..... *occidentalis* n. sp.

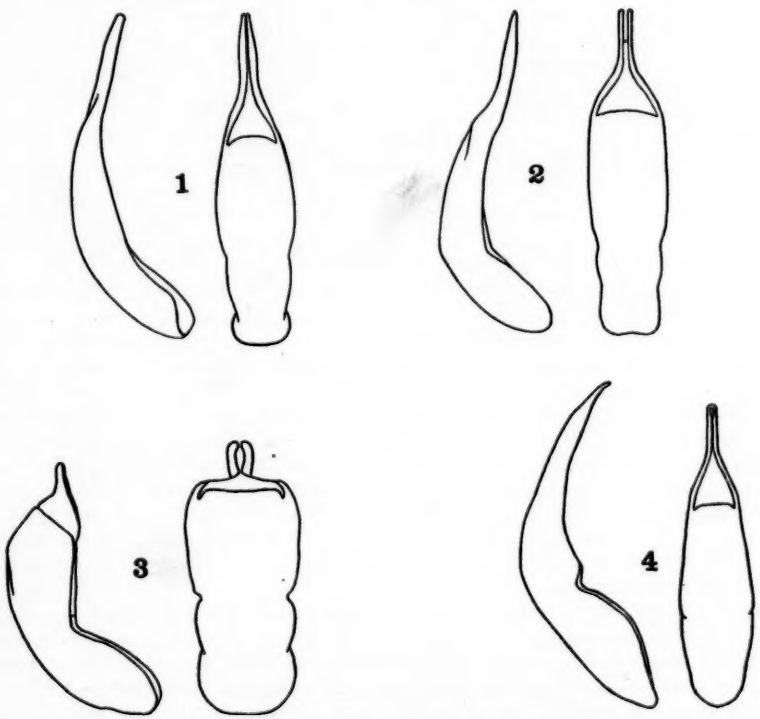
Phytodecta arctica (Mann.)

Gonioctena affinis (Gyllenhal), Mannerheim, 1852, Bull. Soc. Imp. Nat. Moscou, XXV, 369.
Gonioctena arctica Mannerheim, 1853, Bull. Soc. Imp. Nat. Moscou, XXVI, 257; Crotch, 1873, Proc. Acad. Nat. Sci. Philadelphia, XXV, 52.
Chrysomela arctica (Mannerheim), Rogers, 1856, Proc. Acad. Nat. Sci. Philadephia, VIII, 35; Suffrian, 1858, Ent. Zeit. Stettin, 382.
?*Phytodecta scutellaris* Sahlberg, 1885, Vega exped. Vetens, Iakt., IV, 55 (not *Gonioctena scutellaris* Baly, 1862).
Phytodecta arctica (Mannerheim), Gemminger and Harold, 1874, Cat. Coleop., XI, 3470 (as synonym of *nivosa* Suffr.) Leng, 1920, Cat. Coleop. Amer., 295; Schaeffer, 1925, Jour. New York Ent. Soc., XXXII, 140.
Phytodecta affinis (Gyllenhal), Szekessy, 1934, Koleop. Rundschau, XX, 32-34. (*Chrysomela affinis* Gyllenhal, 1808, in part; not *Chrysomela affinis* Fabricius, 1801).

As here recognized, this species is quite variable and may be composite. Its relationships to the European species, *affinis* Gyll. and *nivosa* Suffr., are obscure. According to Mannerheim, the types of *arctica* were collected from willow on the Kenai peninsula of Alaska. They measured from 2 1/3 to 2 1/2 lines. They were colored as follows: pronotum black, the median line apically and the sides, more widely so apically, rufo-ferruginous; elytra rufo-ferruginous, each with two subsutural and three sublateral black spots, the subsutural spots large, oblong, and sometimes confluent, the median the largest of the sublateral spots; appendages and underside black, the basal half of the antennae, the tibiae externally, and the margins of the apical abdominal segment more or less pale. The type series included the following three types of variants: (1) pronotum pale anteriorly as well as on the sides; elytra with the subsutural spots confluent, the basal and median sublateral spots confluent and joined to the subsutural spots; (2) pronotum black, elytra black but with pale margins; (3) pronotum yellowish, with two basal black spots; elytra with the humeral and subscutellar black spots small, the others lacking; legs and antennae pale; body beneath black, the apical segment with pale margins.

The specimens before me are as follows: 5 ♂, latitude 62° 31′–63° 06′,

longitude 137° 30′—139° 30′, near Selkirk, Yukon Territory, 1916 (D. D. Cairner); 43 ♂, 29 ♀, Churchill, Manitoba, feeding and ovipositing on willow, July, 1937 (W. J. Brown); 1 ♂, 2 ♀, Banff, Alberta, July 13 and 18, 1922 (C. B. D. Garrett); 1 ♂, 2 ♀, Nordegg, Alberta, June 10, 1921 (J. McDunnough). In all of the series the head and the entire underside, except the margins of the apical abdominal segment and usually the prothoracic sides, are black. Due to their position the relative lengths of the proximal antennal segments vary slightly in all series, the third segment being about three-fourths as long as the fourth and fifth together in males and about two-thirds as long as the fourth and fifth



Aedeagi of *Phytodecta* in lateral and subdorsal aspects. 1, *P. notmani* Schffr. 2, *P. occidentalis* n. sp. 3, *P. americana* Schffr. 4, *P. arctica* Mann.

in females. In the males, the first segment of each tarsus is distinctly but variably enlarged in each series; the width of the first segment equaling 108 to 115 per cent of the width of the third in the anterior tarsi, 100 to 118 per cent in the middle tarsi, and 95 to 109 per cent in the posterior tarsi. In females the first segment is 80 to 90 per cent as wide as the third in all tarsi. The aedeagus is slender and attenuate apically; the median foramen occupies the basal half of the ventral face, and the median orifice is situated at the apical three-tenths; the parallel apical portion is supplied with a median groove that receives the flagellum; the apex is not emarginate; the flagellum is thread-like, and its proximal end is divided and therefore Y-shaped. The series may be described as follows.

Yukon series of five males. Length 4.7 to 5.5 mm. Body above alutaceous and rather dull, the elytra somewhat variable in this respect but with the apical declivity dull in all specimens. Four specimens with the sides of the pronotum pale, more widely so apically, and two of these with a small pale area on the median line near apex; each elytron with five separated black spots as described for most of the types in two of these, the other two with the posterior sublateral spot lacking; legs black, the tibiae pale externally. The fifth specimen with the dark areas of pronotum greatly reduced, a rather small black spot on each side at base, the basal margin black between the spots; elytra without black markings; legs pale, the femora partly dark.

Churchill series of forty-three males and twenty-nine females. Length of males 4.2 to 5.2 mm., of females 5.0 to 5.7 mm. Body above alutaceous and rather dull in all. Forty-seven of the specimens with the elytra pale and maculate with black, only fifteen of these with five separated spots on each elytron; the remainder with four spots, the posterior sublateral spot lacking; one of these with all the spots obscure, another with the prothorax entirely black above and beneath, the remainder with the prothoracic sides pale above and beneath, and all except two with the anterior pronotal margin pale; all with the tibiae pale externally. Nine males and two females entirely dark except for the tibiae externally and the margins of the apical abdominal segment, the elytra usually dark brown rather than black and with the sides and apical declivity more or less rufescent; ten males and four females like these last but with the elytra a little paler, brownish, with the spots more or less defined but quite obscure and never confluent.

Alberta series of one male and two females from each locality. Length of males 4.2 and 5.2 mm., of females 5.0 to 5.8 mm. Variably alutaceous above, the elytra shining in the two males, rather feebly to strongly dulled in the females. Prothorax entirely black in two specimens, the sides above narrowly rufescent in two and broadly so in one; one specimen with the sides above and beneath and the apex broadly pale. Each elytron with five separated spots in five of the specimens; the sixth with the elytra darker red, the posterior sublateral spot lacking, and the other spots obscure. Sides of the prothorax very strongly arcuate in the larger male, less strongly so in the smaller male, but the arcuation in both stronger than in any specimens of the other series. Abdomen with the punctures considerably sparser than in the other series.

It will be noted that the type series included specimens with the pronotum and elytra almost entirely black and almost entirely pale and specimens with the elytral spots in part confluent. In none of the specimens before me is there any tendency for the elytral spots to become confluent, and in only a single specimen from the Yukon is the body almost entirely pale above. In the Churchill series, the size is smaller than in the Yukon specimens, and, usually, the anterior pronotal margin is broadly pale and the posterior sublateral spot of each elytron is lacking. In the Alberta series, the pronotum tends to be dark; the abdomen is considerably more sparsely punctate; and the pronotal sides are much more strongly arcuate in the male. In view of the variation shown by these series, it seems probable that *arctica* is a geographically variable species restricted to arctic regions and that the Alberta series represent an alpine form that is specifically or subspecifically distinct.

The unique type of *scutellaris* Sahlb. was a small male, with the pronotum and elytra entirely and the underside partly pale, from Port Clarence, Alaska. It is, by description, very closely allied to *arctica* and is probably a variant of that species. The name is preoccupied. Several authors and cataloguers have synonymized *arctica* with *affinis* Gyll. or with *nivosa* Suffr., and according to Székessy, both *arctica* and *nivosa* are synonymous with *affinis*. The ranges of these Old World forms, as given by Székessy, are not continuous, *affinis* occurring

in the northernmost regions of Europe and Asia and *nivosa* being restricted to high altitudes in the Alps. Székessy's American material consisted of three specimens from southern Colorado. Because of these facts and the conclusions of other authors, and because Székessy compared specimens rather than series, it seems well to question his synonymy. Both *affinis* and *nivosa* show color forms quite different from any known to occur in *arctica*. In any case, the matter requires more study, and the name *affinis* Gyll. is preoccupied.

Phytodecta notmani Schffr.

Phytodecta affinis (Gyllenhal), Notman, 1921, Bull. Brooklyn Ent. Soc., XVI, 75-77.
Phytodecta notmani Schaeffer, 1924, Jour. New York Ent. Soc., XXXII, 140; 1928, Canad. Ent., LX, 47.

Form as in *americana*, the size averaging a trifle smaller than in that species. Length 4.7 to 5.8 mm. Pale red or reddish yellow, often entirely so or with only the base of the head and part of the underside blackish; sometimes with small, often obscure, black spots on the pronotum and elytra; the pronotal spots usually subbasal, one on each side; heavily maculate specimens with the pronotal spots basal, each about twice as large as the black scutellum, each elytron with two subsutural and three sublateral black spots, the subsutural and median sublateral spots each about three times as large as the scutellum, the other spots smaller, underside black except for the sides of the prothorax and apical abdominal segments, legs and antennae entirely pale; head usually entirely black in maculate individuals, the mouth parts and two small frontal spots sometimes pale, the clypeus black in specimens with maculate elytra.

Clypeus a little more elongate than in *americana*, the length equaling 43 to 46 per cent of the width. First segment of each tarsus relatively a little wider than in *americana*, its width equaling from 88 to 100 per cent of the width of the third segment in the male and 78 to 87 per cent in the female.

Aedeagus slender, attenuate apically; the median foramen occupying the basal third of the ventral face; the median orifice at apical third; the parallel apical portion with a median groove that receives the thread-like flagellum; the apex with a feeble notch.

Apparently, this species may be distinguished from *occidentalis* and from most specimens of *americana* by color as noted in the key. The types of the species were found breeding on willow by Notman at Keene Valley, New York. Schaeffer confused Notman's host records of *notmani* and *americana;* reference to Notman's paper shows that it is the lightly maculate, willow feeding species to which the original description of *notmani* applies.

The species is represented in the collections by thirty-five specimens from Heart Lake (Essex Co.) and Underwood, N. Y.; Ste. Agathe des Monts and Maniwaki, Que.; Nipigon, Ont.; Boucher, Sask.; Great Slave Lake, N. W. T.; Seebe, Standard, Olds, Cypress Hills, Medicine Hat, Banff, and Elkwater, Alta. The series suggest that specimens with the pronotum and elytra maculate occur seldom in the prairie regions but commonly in eastern areas. Of the fourteen specimens from the prairie and grove belts of Alberta, one is heavily maculate, and the others have the clypeus, pronotum, and elytra entirely pale. Of the eighteen New York specimens, only three are as pale as most of the Alberta examples, the others having the clypeus black, the pronotum bimaculate, and the eytra more or less maculate.

Phytodecta americana Schffr.

Chrysomela rufipes (DeGeer), Kirby, 1837, Richardson's Fauna Boreali Americana, 213; Rogers, 1856, Proc. Acad. Nat. Sci. Philadelphia, VIII, 35; Suffrian, 1858, Ent. Zeit Stettin, 381.
?Gonioctena viminalis (Linnaeus), Mannerheim, 1853, Bull. Soc. Imp. Nat. Moscou, XXVI, 256.

Gonioctena pallida (Linnaeus), Crotch, 1873, Proc. Acad. Nat. Sci. Philadelphia, XXV, 52.
Phytodecta pallidus (Linnaeus), Notman, 1921, Bull. Brooklyn Ent. Soc., XVI, 75-78.
Phytodecta americana Schaeffer, 1924, Jour. New York Ent. Soc., XXXII, 139; 1928, Canad. Ent., LX, 47.

Length 4.8 to 6.5 mm. Color extremely variable; the palest specimens red or reddish yellow and with the head at base and metasternum at middle infuscate; darker specimens with the pronotum marked with two triangular black spots, these basal, nearly always more or less fused along the median line, sometimes attaining the apex and nearly always extending onto the apical half; each elytron sometimes with two subsutural and three sublateral black spots of moderate size, these usually reduced in size, lacking entirely or in part, or obscure even in specimens having the pronotum heavily maculate, the posterior subsutural and sublateral black spots frequently confluent, the elytra sometimes entirely brown or blackish except for the marginal intervals and epipleura; maculate specimens with the underside blackish except for the sides of the prothorax and the abdomen in part; antennae entirely pale; legs pale, the femora occasionally banded with dark; all specimens with the clypeus and most with the entire anterior half of the head pale.

Clypeus a little less elongate than in the other species, its length equaling 37 to 40 per cent of its width. The first segment of each tarsus relatively a little narrower than in the other species, its width equaling 74 to 83 per cent of the width of the third segment in the male and 70 to 78 per cent in the female.

Aedeagus stout, not narrowed apically; the median foramen occupying the basal half of the ventral face; the median orifice at apical fifth; the ventral face at apex with two projecting lobes between which is received the flagellum; the latter compressed and therefore ribbon-like rather than thread-like as in the other species.

This is the common species of the East, and it feeds on the aspen poplar, *Populus tremuloides* Michx. The types were found breeding on "poplar" at Keene Valley, New York, by Notman. It is evident from Notman's paper that Schaeffer, referring to *americana* as a willow-feeder, is in error.

The collection contains about 270 specimens of *americana*, including long series from localities in New York, Quebec, Ontario, and Manitoba. The specimens show no evidence of geographical variation. The following localities are represented: Rumney and Mt. Washington, N. H.; Chicago Bogs (Cortland Co.), Connecticut Hill (Tompkins Co.), Sonyea, Allegany State Park, summit of Mt. MacIntyre, summit of Mt. Marcy, Heart Lake (Essex Co.), N. Y.; Derrick City, Penn.; Tabusintac, N. B.; Brome, Magog, Knowlton, Seven Islands, and the Ottawa district, Que.; the Ottawa district, Peterboro, Sudbury, Smoky Falls, Biscotasing, North Bay, and Hymers, Ont.; Aweme, McMunn, and Riding Mountain Park, Man.; Indian Head, Boucher, Wenoncha, and Prince Albert National Park, Sask.; Seebe, Waterton Park, Bragg Creek, Elkwater, Cypress Hills, Medicine Hat, Kananaskis, and the Peace River district, Alta.; Fernie, B. C.

Phytodecta occidentalis n. sp.

Body a little more robust and convex than in *americana* and *notmani*. Length of holotype 4 mm., of male paratypes 4 to 4.3 mm., of females 4.4 to 5 mm. Color much as in *americana;* black; mandibles, labrum and clypeus red, this red area extending slightly onto the front at middle; pronotum with the sides broadly red, more broadly so anteriorly, the dark discal area with an anterior, V-shaped emargination in most of the paratypes, the anterior margin entirely red in several paratypes; each elytron of fully marked specimens with two subsutural and three sublateral spots as in the other species; the humeral and median sublateral spots small, frequently lacking; the subscutellar subcircular, from two to four times as large as the scutellum; one paratype with all spots except the subscutellar lacking, another with all sublateral spots lacking, all others

except two with the posterior subsutural and posterior sublateral joined together to form a band extending obliquely from a point near suture at middle to a point near the lateral margin at apical third; the median sublateral spot joined to the posterior subsutural in five of the paratypes; body beneath with the sides of the prothorax and margins of the apical segment red; antennae and legs red; the femora with black or infuscate areas at middle, sometimes almost entirely black.

Clypeus a little more elongate than in *americana,* its length equaling 41 to 46 per cent of its width. First segment of each tarsus relatively a little wider than in *americana,* its width equaling from 87 to 100 per cent of the width of the third segment in the male and from 78 to 85 per cent in the female.

Aedeagus slender, rather abruptly narrowed apically; the median foramen occupying the basal third of the ventral face; the median orifice at apical third; the parallel apical portion with a median groove, the groove terminating in a narrow, very deep cleft that, like the groove, receives the thread-like flagellum.

Holotype. ♂, Clinton, B. C., June 19, 1938, on *Salix* (G. S. Walley); No. 5287 in the Canadian National Collection, Ottawa.

Allotype. ♀, same data.

Paratypes. 1 ♂, 6 ♀, same data; 1 ♂, Stanley, B. C., July 2, 1932 (K. Graham); 2 ♂, 6 ♀, Prairie Hills (near Golden), B. C., July 12-18, 1908 (J. C. Bradley); 2 ♂, 5 ♀, Carbonate to Prairie Hills (near Golden), B. C., July 12-18, 1908 (J. C. Bradley); 4 ♀, Jasper, Alta., September 4, 1926 (R. D. Bird).

This small species resembles *notmani* in the characters of the clypeus and tarsi but approaches *americana* in color. In *americana,* the pale area of the front is usually more extensive, the femora are only rarely darkened at middle, and the apical spots of the elytra show less strong tendencies to become confluent.

STUDIES IN NEW WORLD *PLECIA* (DIPTERA, BIBIONIDAE) PART II*

BY D. ELMO HARDY,

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The species discussed below have been received from the United States National Museum, the American Museum of Natural History, Cambridge Museum of Comparative Zoology, Cornell University, Michigan State College, British Museum of Natural History, and Deutsches Entomologisches Institute, or are in the Snow Entomological Collection at the University of Kansas. The writer is very grateful to these institutions for the privilege of studying this material. These species will be keyed and figured in a forthcoming revision of the New World *Plecia.*

Plecia (Rhinoplecia) biarmata n. sp.

This species is related to *bicolor* Bell. and cannot be separated from that species without use of the male genitalia. The fork of the Rs arises at the end of vein R_1+_2; R_3+_4 arises vertically for a short distance then slants gradually into the costa in the male, more obliquely in female. These characters may be variable and would not present a convenient means of separation.

Male genitalia. The genitalia of this species are extremely diversified; the ninth sternum is very broad, with a medial projection which is concave on its posterior margin. The claspers are large and divided into two well developed lobes visible from above; the outer arms being more stoutly developed. The ninth tergum is gently concave on its posterior margin.

*The preceding part of this study was published in 1940 (Jour. Kansas Ent. Soc., XIII, 15-27).

In the female the metapleurae, hypopleurae, ptero and propleurae are rufescent tinged; the antennae are eleven segmented, with the segments rather compressed.

Length: male, body, 4.5 mm.; wings, 4.7-5 mm. Female, body 5 mm.; wings, 6-6.5 mm.

Holotype male, allotype female, and one paratype female, Crontena, Costa Rica, May 6-7, 1924 (J. C. Bradley).

Holotype and allotype returned to Cornell University; paratype retained in the Snow Entomological Collection.

Plecia (Rhinoplecia) biformis n. sp.

This species is related to *rufithorax* Walker by having the thorax entirely rufous and the rostrum produced longer than the length of the antennae. The genitalia also show relationship but the specific characters are very pronounced in both sexes.

Male genitalia. The posterior lateral margins of the ninth sternum are not produced and the hind median margin is developed into two prominent lobes, each is divided at its apex, a V-shaped cleft separates the two developments; the sternum is slightly grooved longitudinally down the middle. The harpagones are strongly produced on upper apical edges and each is developed into a sharp pointed tooth below. The upper lobe is much larger, more obtuse, while the lower is smaller, more acute, instead of the lower portion of the apex being the more strongly developed as in *rufithorax*. The ninth tergum is much shorter than the sternum and rather deeply concave on posterior margin, posterior lateral margins rather acutely pointed, not so rounding as in *rufithorax*. The bottom of the cleft has a slight membranous portion and the margins are covered with dense short hair.

Length: body, 4.5-5 mm.; wing, 5.5 mm.

Female genitalia. The eighth sternum is developed into a pair of median lobes on hind margin, with a deeply V-shaped cleft between; this cleft extends nearly half the length of the segment. Posterior lateral margins broadly rounding, covered with dense fine hairs on the sides; the sternum is almost twice as wide as long and differs from *rufithorax* in the development of the posterior margin. The ninth tergum has a broad troughlike cleft extending half the length of the segment, the lateral lobes are rather square topped (more undulated in *rufithorax*) and are densely covered with fine hair. Cerci broad and rounding.

Length: body 7 mm.; wing, 7.5-8 mm.

Holotype male and allotype female, Trinidad (Urich).

Both are in the Snow Entomological collection.

Plecia (Rhinoplecia) brazilana n. sp.

This species is related to *collaris* Fab. by having the anterior portion of the dorsum blackish. It is distinguished from other species in this complex by having the posterior margin of the ninth sternum concave and by the blunt median lobe of the ninth tergum.

Male.—Head: Rostrum greatly produced, almost twice as long as head and about three times as long as the antennae. Antennae yellow-brown to dark brownish, composed of nine segments. Compound eyes divided by a transverse groove at about lower one-third. *Thorax*: Dorsum rufous with a dark brown to black discoloration on the anterior portion in the middle, pleurae reddish brown to black, much darker in color than the dorsum. Sternopleurae shining on the lower halves, pleurae otherwise subopaque. Stems of halteres reddish to slightly brownish, knobs brown. *Legs*: Bases of femora yellowish, verging into rufescent brown apically, legs otherwise brown to black; pile short, dense

and black. Basitarsi about equal to the next three subsegments in length. *Wings*: Brownish fumose, anterior branch of radial sector (R_3+_4) arising slightly beyond the end of R_1+_2 and extending almost vertically into the costa. Fork of media arising at about one-third the distance between the r-m crossvein and the fork of the Rs. Cubital cell widely opened. *Abdomen*: Faintly shining on the venter, opaque above. *Genitalia*: Ninth sternum rather broad with a moderate concavity on the posterior border in the middle, developed into a heavily sclerotized point on each posterior lateral margin. Claspers simple, bluntly pointed and slightly curved outward. Ninth tergum somewhat divided into two portions by a V-shaped groove in the middle on the posterior margin, out of which arises a blunt, almost square topped development.

Length: body, 3.8-4 mm.; wing, 4.6-4.8 mm.

Female. Differs in having the rostrum even more elongate, the femora are more yellow basally, R_3+_4 arises vertically for a very short distance then slants obliquely into the costa. Antennae eleven-segmented.

Length: body, 4.3 mm.; wings, 5.4 mm.

Holotype male, allotype female, and six paratype males, West Border, Matto Grosso, Brazil, May 31 (R. C. Shannon). Holotype, allotype and three paratypes returned to United States National Museum; others retained in Snow Entomological Collection.

Plecia (Plecia) curvistylata n. sp.

This species is probably closer to the *collaris* group as the anterior portion of the mesonotum is discolored. This discolored area is, however, only slightly darkened and not distinctly blackened as in others of the complex. This species is also of much smaller size, the rostrum is not quite as long as the antennae, and R_3+_4 is more decidedly curved before entering the costa. The male genitalia will distinguish it.

Male genitalia. Posterior lateral margins of the ninth sternum not developed, hind margin with a gentle concavity in the middle. Harpagones elongate and curved inward, only their bases visible from ventral view. Ninth tergum deeply concave on hind margin, wider than long.

Length: body, 3-3.5 mm.; wing, 3.6-4 mm.

Holotype male, Cuernavaca, Morelos, Mexico, June (H. H. S.); one paratype male, same data. Holotype will be returned to the British Museum, paratype retained in Snow Entomological Collection.

Plecia (Rhinoplecia) dentata n. sp.

This species approaches *rufithorax* Walker and can be separated conveniently only by use of the male genitalia; these structures differ very distinctly. The wing venation also differs as follows: The fork of the radial sector (R_3+_4) arises vertically toward the costa then makes a sharp turn into the wing margin; fork of media situated slightly before middle of the distance between r-m crossvein and fork of Rs; Cu strongly curved downward, narrowing the cubital cell.

Genitalia. Posterior margin of ninth sternum with a U-shaped concavity. Posterior lateral margins rather strongly developed. Harpagones large, blunt with a small beaklike apex as seen from ventral view; from a lateral view a toothlike development is visible on the dorsal surface. Apices of harpagones covered with dense short, brownish pile and long hairs. The exact shape of the clasping structures is difficult to discern and many interpretations may be had according to the angle from which they are viewed. Ninth tergum but little wider than long, with a small convexity on the posterior margin.

Length: body, 5-6 mm.; wings, 6.5 mm.

Holotype male, Chontales, Nicaragua (Janson). This will be returned to British Museum.

Plecia (Rhinoplecia) disparis n. sp.

Related to *Plecia bicolor* Bell. but differing distinctly in the male genital structures; the wings also appear to be more lightly fumose.

Male genitalia. Ninth sternum broad, with a well developed median process on its posterior border, apodeme of ninth sternum greatly developed and rounding at the apex, sometimes appearing to be a second lobe of the harpagones from a lateral view; harpagones broad, bluntly tipped. Aedeagus large and rounding, with two heavily sclerotized supporting processes laterally. Ninth tergum moderately concave, the bottom of the concavity almost straight.

In other characters this species cannot be separated from *bicolor* Bell.

Length: body, 5.3 mm.; wing, 6 mm.

Holotype male, upper Putamyo River, Colombia, (B. Guevaro). Returned to the United States National Museum.

Plecia (Rhinoplecia) ecuadorensis n. sp.

This species is related to *rufithorax* Walker and can be separated only by the marked structural differences in the male genitalia. The specimens are of slightly larger size and vein R_{2+4} is curved rather sharply near the base.

Male genitalia. Approaching *xenia* n. sp. in having the posterior lateral margins of ninth sternum strongly developed and the ninth tergum with a narrow slitlike invagination extending over one-third the length of the segment down the middle. Ninth sternum gradually convex on the hind margin, with a strong acutely pointed development medianly. Harpagones large and somewhat irregular but without such processes as possessed by *xenia*, developed into a rather acute point apically above, as seen from a ventral view, and with a sharp toothlike point above from a lateral view. Ninth tergum longest on the lateral margins, gently concave on the posterior margin; segment wider than long. The genitalia differ from *xenia* in the development of the tergum, sternum and harpagones.

The female genitalia have not been dissected.

Male length: body, 6-6.5 mm.; wing, 7-8 mm. Female length: body, 7-7.5 mm.; wing, 8-8.5 mm..

Holotype male, Ecuador, S. America, 1903–74 (W. Rosenberg); allotype female, same data. Two paratype males, Pasto, Colombia, No. 88 (B. Guevara). Holotype and allotype will be returned to the British Museum of Natural History, one paratype returned to the United States National Museum and one retained in the Snow Entomological Collection.

Plecia ecuadorensis micans n. var.

This variety differs from the type species in having the mesonotum and lower portions of the sternopleurae shining reddish instead of opaque yellow-orange; the variety is also smaller in size. The females are sometimes marked with black on the dorsum; one specimen has the entire thorax deeply black tinged.

Female genitalia. Ninth tergum with a broad, flat bottomed cleft on hind margin; posterior lateral margins rounding. Cerci rounded apically, longer than wide. Eighth sternum distinctly divided into two plates by a deep cleft extending down the middle longitudinally, posterior margins of each plate produced into a large rounding median lobe and a moundlike swelling toward the sides; segment about twice as wide as long.

Male length: body, 3.5-4 mm.; wing, 5-5.5 mm. Female length: body, 5 mm.; wing, 6.5 mm.

These would certainly appear to belong to a different species, but the male genitalia are identical. This is the only example the writer has encountered in the *rufithorax* group in which the thorax is not opaque.

Holotype male, allotype female, and five paratypes, three females, two males, Guayaquil, Ecua. (F. Campos R); one paratype female, Hulgra, Ecuador, 4000 ft., May 21, 1923 (F. X. Williams), and four paratypes, three males, one female, Ecuador, 1920–469 (Gilbert Hammond).

Holotype, allotype and three paratypes returned to the United States National Museum; two will be returned to British Museum; others retained in Snow Entomological Collection.

Plecia (Rhinoplecia) gibbosa n. sp.

This species is closely related to *rostellata* Loew because of the structural similarities. The rostrum is not as long as in that species, being about as long as the head, slightly shorter than the antennae, and the genitalia of both sexes differ considerably. The harpagones are more sharply pointed, the median lobe of the sternum is membranous and rather square topped; the hind margin is produced into a pair of rounding lobes at the base of the claspers and the posterior lateral lobes are more strongly developed, extending over one-half the length of the claspers. From end view the hind margin of the tergum is seen to fold back, producing a broad shelflike portion extending around the upper part of the genital chamber; the median portion is developed into a strong point. The mesonotum of the male has sparse, short black hairs on the sides; propleurae and anterior part of mesopleurae and sternopleurae with somewhat obscure brown markings. Abdomen more sparsely haired, with fine, light brown pile; also of smaller size. In addition, the posterior lateral margins of ninth sternum are developed, hind margins with a median gibbosity of a somewhat membranous nature. Harpagones simple, with beaklike apices. Ninth tergum concave on the posterior margin, with a small convexity in the bottom of the cleft.

Female genitalia. Eighth sternum completely divided into two plates by the median cleft. Median lobes of hind margin rounding; lateral lobes square topped, extending less than one-half the height of the median pair; segment much wider than long. The lateral lobes of *rostellata* are acutely pointed, and the entire segment is differently shaped. Ninth tergum about four times as wide as longest point, with a very broad, deep cleft on hind margin and a distinct convexity in the bottom of the cleft. This sclerite differs strikingly from *rostellata* in that the anterior lateral margins are not at all produced and the bottom of the cleft not square.

Male length: body, 5.5-6 mm.; wings, 6.5 mm. Female length: body, 7 mm.; wings, 8 mm.

Holotype male, allotype female on same pin, S. Bernardino, Paraguay (E. Fiebrig). Paratypes, one male, one female, same data as type; one male, one female, San Jose, N. Arg., Oct., 1925 (Lindner, D. Chaco-Exped.).

Holotype and allotype reurned to United States National Museum and one paratype will be returned to British Museum; others retained in Snow Entomological Collection.

Plecia (Rhinoplecia) xenia n. sp.

This is related to *rufithorax* Walker but the male genitalia are very different; the fork of the radial sector (vein R_{3+4}) is somewhat more sharply curved at its middle and the fork of the media arises just before the middle of the distance between the r-m crossvein and the fork of the Rs.

Male genitalia. Posterior lateral margins of the ninth sternum strongly produced, extending almost as long as posterior median margin of sternum; the segment is gradually convex, with a small development in the middle on hind margin which is scarcely visible from a ventral view. Harpagones well developed and very irregular in shape, covered with numerous teethlike points

and bumps. Ninth tergum about as high as long, longest in middle, gently convex, with a narrow slitlike invagination medianly on the posterior margin.

Male length: body, 4-5 mm.; wing, 4.5-6 mm.

Female genitalia. Eighth sternum twice as wide as long, with the posterior lateral margins more elongate than the rounded median lobes. Ninth tergum about half as long on lateral margins as its width, deeply cleft on both anterior and posterior margins, with only a narrow bridge of sclerite joining the lateral plates; lateral plates strongly produced anteriorly.

Female length: body, 5-6 mm.; wing, 5.5-6 mm.

Holotype male, allotype female, and eight paratype males, Higuito San Mateo, Costa Rica (Pablo Schild). Three paratype males, San Jose, C. R., July (H. Schmidt); one female paratype, San Carlos, C. R. (Schild); eight males and one female, Santa Ana, Costa Rica, Dec. 22, 1934, No. 3285 (C. H. Ballou).

Holotype, allotype and eleven paratypes returned to the United States National Museum; two paratypes will be deposited in the British Museum, the others are in the Snow Entomological Collection.

Plecia (Plecia) incurvata n. sp.

This species belongs in the *confusa* complex but differs strikingly from all other species known to the writer. The male genitalia resemble *P. parvistylata* n. sp. in having the posterior lateral margins of the sternum produced, but the harpagones are more elongate and the ninth tergum more deeply concave but not developed clasperlike as in *P. confusa* Loew. The compound eyes are distinctly divided into upper and lower portions by a partitioning line or groove running across the middle. This is the first time the writer has observed this character in the *confusa* complex. The wing venation is also distinct in this species.

Male.—Head: Antennae entirely black, consisting of ten segments, including a nipplelike tip. Rostrum slightly over one-half the length of the antennae. Mesonotal furrows not as deep as in *parvistylata*. Wings: Vein R_1+_2 merging with R_3+_4 at its tip, far removed from the end of the subcostal vein; R_3+_4 arising vertically to the costa. Fork of media situated at about basal one-fourth of the distance between r-m crossvein and the fork of the radial sector. Vein R_5 strongly curved inwardly toward anterior margin behind the fork of the Rs. Wings dark brown fumose on costal margin, stigma barely discernible from the membrane. *Genitalia*: Ninth sternum moderately concave medianly on hind margin, posterior lateral margins developed into clublike lobes. Harpagones rather small, elongate and projecting inward, usually only bases visible from ventral view. Ninth tergum deeply cleft, about three-fourths its length; tergum extending much beyond hind margin of the ninth sternum.

Length: body, 5.5 mm.; wing, 6.5-7 mm.

Holotype male, Guadeloupe Island, West Indies, July 30, El. 3000 ft. (Aug. Busck). Returned to the United States National Museum.

Plecia (Rhinoplecia) maculata n. sp.

This species approaches *P. rostellata* Loew in the development of the rostrum and its larger size but is very different.. The blackened pleurae and dark brown costal section of the wing together with its distinctive genitalia will separate it.

Male.—Head: Antennae black, with a barely perceptible brownish tinge, eight-segmented, the last five segments of the flagellum almost round. Rostrum much longer than the antennae, mouthparts entirely black.. *Thorax*: Opaque, mesonotum rufous, with a median brown to black stripe extending backward from the anterior part of the dorsum, this divided down the middle by a fine

rufous line. Mesonotum also with a brownish discolored area on each side behind the middle. Scutellum with a black spot in the center. Pleurae chiefly brown to black, with rufous markings on the hind portions of the sterno and mesopleurae and the middle of the pteropleurae. Knobs of halteres black, stems pale. Thorax entirely bare, with but microscopic pubescence. *Wings*: Brown fumose at base and on anterior margins, anterior veins dark brown. Posterior portion of wing almost hyaline, just slightly fumose. Vein R_3+_4 arising almost vertically into the costa. Fork of media at about the basal one-third to one-fourth the distance between the r-m crossvein and the fork of the Rs. Cu_1 sharply curved downward at its tip. Abdomen shining black, with dense black pile. *Genitalia*: Ninth sternum large and very irregularly developed on posterior edge, posterior lateral margins produced into rather strong lobes. Harpagones of medium size, with only bases visible from a ventral view, developed into a beaklike point on the inner side, as seen from a lateral view. Ninth tergum deeply and narrowly concave, the cleft extending to about the basal one-third of the segment.

Length: body, 8.5-9 mm.; wing, 9 mm.

Holotype male, W. Indies, E. Coast, Trinidad, Mayaro, 10-1-1924 (S. A. Neave); one paratype male, Port of Spain, Trinidad (W. S. Brooks).

Holotype will be returned to the British Museum. Paratype returned to Cambridge Museum of Comparative Zoology.

Plecia (Rhinoplecia) panamaensis n. sp.

This species can be separated from *P. rufithorax* Walker only by the genital characters, but these structures are so distinct that there can be no doubt of its identity, even in undissected specimens. The long processes on the hind margin of the ninth sternum will separate it readily from any species known to the writer.

Male genitalia. Posterior margin of ninth sternum produced into two long outward projecting prongs with a deep V-shaped cleft between; on the outer margins of these median developments, just below their middles, a slender sclerotized rod extends underneath the apical margin of the segment to attach to the body wall at the bases of claspers. These rods probably serve for muscle attachments. Harpagones rather strong, somewhat broadened apically, pointed inwardly on their apices from a ventral view. Posterior lateral margins of tergum slightly developed; segment broader than long, with a small V-shaped excavation in the middle on the hind margin, as seen from a dorsal view. The tergum folds back on the posterior edge producing a broad flat area before the anal region.

Length male: body, 5.2-5.8 mm.; wing, 6 mm.

Female genitalia. Eighth sternum almost twice as wide as long, the posterior median pair of lobes rather acute and slightly concave on inner margins; hind margin of each plate with a distinct concavity in middle and a broad rounding outer lobe. Ninth tergum only twice as wide as its greatest length, deeply cleft on hind margin, with only a narrow strip of sclerite joining the two lateral plates.

Length female: body, 6.7 mm.; wing, 7.4 mm.

Holotype male, Cano Saddle, Gatun L. Panama, May 12, 1923 (R. C. Shannon); allotype female, Boqueron Riv., Panama, May 1907 (A. Busck). Paratypes: one female and five males, same data as holotype; one male, one female same data as allotype; one male, Cabima, Panama, May 18 1911 (A. Busck) one male, Tubernilla, Canal Zone, Panama, and one female, Canal Zone, Barro Colorado.

Holotype, allotype and five paratypes returned to the United States

National Museum; one paratype returned to Cambridge Museum of Comparative Zoology; others retained in Snow Entomological Collection.

Plecia (Plecia) parvistylata n. sp.

Related to *P. confusa* Loew but more closely approaching *P. incurvata* n. sp. structurally; it separates from either of these by the shape of the ninth tergum and the harpagones..

Male. Beak shorter than antennae and scarcely visible. Antennae nine-segmented, brownish yellow. Thorax deep orange; the outside median furrows of the mesonotum are more deeply grooved and the legs more densely haired than in any which have been observed in the *confusa* complex. The legs are shining black and very densely covered with long black hair. *Genitalia*: Ninth sternum gently concave on the posterior margin, posterior lateral margins rather strongly developed into knoblike lobes; harpagones very small and folded inwardly, pointed on the outer apical edges. Ninth tergum only moderately concave, with a strong median projection on hind margin.

Length: body, 4.5-5 mm.; wing, 6 mm.

Holotype male, Antigua, Guatemala, May 14, 1925 (E. G. Smyth). Returned to the United States National Museum.

Plecia (Rhinoplecia) perplexa n. sp.

Related to *P. bicolor* Bell. and *collaris* (Fabr.) but easily separated by the unusual development of the male genitalia. The male has a small black area on the anterior portion of the dorsum, placing it in the *collaris* group, but in the female this is but faintly darkened.

Male genitalia. Ninth sternum wider than long, longest on a median line, with two moderate developments on hind margin near median portion; between these median lobes is a slightly convex area. The posterior lateral margins of sternum are scarcely produced. Harpagones broad at their bases, terminating in a narrow fingerlike development apically, minutely shagreened on inner surfaces. A clasperlike process outward from each side of the aedeagus, developed almost as long as the harpagones and plainly visible from ventral view. These are apparently accessory lobes of the aedeagus and appear to be attached to this organ by membrane along their inner sides; however, they terminate basally in two appendages which might serve for muscular attachments, suggesting that they are possibly functional as clasping structures. Ninth tergum with a V-shaped excavation on posterior margin, from a dorsal view; the hind margin is folded inward and developed into two rounding lobes as seen from an end view.

Male length: body, 4.3 mm.; wing, 4.8 mm. Female length: body, 4.3 mm.; wing, 5.5 mm.

Holotype and allotype, Cuba, 226/57 (Loew). Both returned to the Cambridge Museum of Comparative Zoology. One paratype female Buenos Aires, Trinidad Mts., Cuba, May 8-14, 1936, 2500-3500 ft. (Darlington), retained in Snow Entomological Collection.

Plecia (Plecia) pertinens n. sp.

This species is related to *P. confusa* Loew in having the rostrum shorter than the head and thorax entirely yellowish to orange-red and possesses only minor differences other than those of the male genitalia. The antennae of the male are nine-segmented, the upper portions of the sternopleurae are pale haired. The fork of the radial sector (vein R_3+_4) slightly bent in the middle, not nearly straight as in *confusa*. Vein R_1+_2 ending about half way between the end of the

subcostal vein and $R_{3}+_{4}$, not ending close to this vein as in *confusa*. In the allotype the bend in $R_{3}+_{4}$ is closer to the base of the vein and $R_{1}+_{2}$ is still more remote from this vein.

Male genitalia. Ninth sternum wider than long, posterior lateral margins developed into two rather strong lobes, with a convexity in the depression. Harpagones very small and undeveloped, appearing rather obtuse from a ventral view. From a lateral view the harpagones are developed into a small point on inner apices. Ninth tergum concave on posterior margin with a heavily sclerotized, blunt protuberance in the middle.

Male length: body, 5.3 mm.; wing, 6 mm.

Female genitalia. Eighth sternum with a U-shaped cleft extending two-thirds the length of the segment, posterior median lobes well developed and rounding, outside of these and extending dorsally in toward the genital chamber is a pair of long, slender lobes which probably serve as egg guides. The ninth tergum is twice as wide as its greatest length, with a broadly V-shaped cleft extending three-fourths its length on hind margin.

Female length: body, 6.5 mm.; wing, 7.5-8 mm.

Holotype male, Venta de Zopilote, Guerrero, Mex., 2800 ft., Oct. (H. H. Smith); allotype female, same data. Paratypes: one male Guatemala City (Champion); one female, State of Colima, Mex.; one female, Tegucigalpa, Honduras, June 6, '09, and one male, Moca, Guatemala, March 24, 1935, 3000 ft. (D. M. Bates).

Holotype and allotype will be returned to the British Museum, one paratype returned to the United States National Museum, one returned to Cambridge Museum of Comparative Zoology, and one paratype retained in the Snow Entomological Collection.

Plecia (Rhinoplecia) rectiora n. sp.

The mouthparts of this species are intermediate between *P. confusa* Loew and *rufithorax* Walker. They are about equal to the antennae in length; the mesonotum is only faintly furrowed, and the legs and abdomen are brown with a faint reddish tinge. The species, however, can be separated conveniently only by using the male genitalia; these structures differ from any other species in the complex.

Genitalia. Ninth sternum more strongly produced on the posterior lateral margins; these lobes extend beyond the median edge of the segment about three-fourths the length of the harpagone.. Harpagones simple, pointed apically; accessory plates at each side of aedeagus large and well developed, each with a strong outward projecting spine on outer margin near apex as seen in end view. Ninth tergum with a broad flat bottomed excavation on the hind margin; this cleft has a very minute niche in middle as seen from dorsal view. The hind margin of the tergum is folded over into the genital chamber, broadly produced, rounding on the sides, and developed into an inward projecting point from end view.

Length: body, 5.5-6 mm.; wing, 7.4 mm. Females are slightly larger in size, body, 7-7.4 mm.; wing, 9-10 mm. .

Holotype male, S. Luiz Ricamar, Est Maranhao, Brazil, Jan. 9, 1935, (Fiquene); allotype female, same data. Three paratypes, two males, one female, Sapacay, Paraguay, Feb. (W. T. Foster), and Villarica, Paraguay, Dec., 1926 (F. Schade).

Holotype, allotype and one paratype in Snow Entomological Collection. One paratype returned to the United States National Museum and one to Michigan State College.

Plecia rufithorax concava n. subsp.

The specimens here discussed are considered a subspecies of *rufithorax* because of the apparent close relationship shown in the genital structures of both sexes. The males differ chiefly in having the ninth tergum moderately concave, broadly U-shaped on hind margin. The ninth sternum and harpagones appear to be identical. The female genitalia show considerably more differentiation than those of the male. The cleft of ninth tergum is broadly U-shaped on hind margin instead of being wide and flat bottomed as in typical *rufithorax*, and the posterior lateral margins of the tergum are broadly rounded, not indented. The tergum is almost twice as wide as long. Eighth sternum developed into two prominent lobes near middle on hind margin, these characteristically notched on their outer margins. Specimens of both sexes are also of larger size than the typical *rufithorax*, the female of *concava* being almost twice as large.

Length: male, body, 6 mm.; wing, 6.7-8 mm. Female, body, 7.4-8.6 mm.; wing, 9.4-10.7 mm.

Holotype, allotype and one paratype returned to the United States National Museum, one paratype returned to the Museum of Comparative Zoology at Harvard and four returned to the American Museum; others retained in the Snow Entomological Collection.

Plecia (Rhinoplecia) serrata n. sp.

This species is related to *P. vittata* Wiedemann and *P. bicolor* Bellardi but separates from all other members of this genus by its unique genitalia.

Male. Antennae nine-segmented, the terminal segments small and nipple-like. Rostrum as long as the head, longer than the antennae. Pleurae brown to black, with a faint rufous tinge. Dorsum entirely rufous, halteres black. Legs chiefly black, bases of femora somewhat yellowish. Wings smoky fumose, vein R_3+_4 almost vertical, but slightly curved into the costa. Fork of veins M_1 and M_2 situated at about the basal one-third of the distance from the radio-medial crossvein to the fork of the radial sector. Stigma concolorous with the membrane. *Genitalia*: Ninth sternum with a pair of pointed lobes on the posterior margin in the middle, posterior lateral margins of sternum not developed. Harpagones strong, very broad, with numerous small pointed teeth on the inner apical edges, as seen from the ventral view. Ninth tergum with a small concavity medianly on the hind margin.

Length: body, 4 mm.; wing, 4.7 mm.

Holotype male, Villarica, Paraguay, Oct., 1938 (F. Schade). Returned to Professor C. W. Sabrosky, Michigan State College.

Plecia (Rhinoplecia) trilobata n. sp.

This species is near *P. bicolor* Bellardi, but the male genitalia are so distinctive that its identity can not be mistaken. The antennae are distinctly yellowed in this species and the pleurae are somewhat tinged with rufescent.

Male. Antennae nine-segmented, counting knoblike tip. Rostrum produced slightly longer than the antennae. Compound eyes divided by a shallow furrow on lower one-third. Wings comparatively short, about equal to the length of body, vein R_3+_4 gently curved. Hind tarsi somewhat swollen, subsegments short. *Male genitalia*: Ninth sternum rather elongate compared with its width, its posterior margin undulated. Harpagones three lobed, two arms visible from ventral view, the third only seen from lateral. Dorsal arms long and curved, median arms small, with two apical points, ventral lobes large and rounding, the surface densely pitted. Ninth tergum broad, with a small V-shaped concavity from a direct dorsal view; the inner top edge of the segment is developed inward into a broad flat area and two sharp points; this can only be seen by looking directly down into the genital chamber.

Length: body, and wings, 4.7-5 mm.

Female. Antennae eleven-segmented; bases of femora somewhat yellowed; pleurae more rufous tinged, all tarsi slender.

Length: body, 5.8 mm.; wing, 6.4 mm.

Holotype male, British Guiana, Upper Courantyne R., King Frederick William IV Falls, March 14-22, 1936. Allotype female in copulation with holotype; one paratype male, same data.

Holotype and allotype will be returned to the British Museum. Paratype retained in Snow Entomological Collection.

Plecia (Rhinoplecia) uberta n. sp.

This species is related to *P. collaris* (Fabricius) in having the anterior portion of the dorsum blackish; it is distinguished by its small, acutely pointed harpagones, small median development on the hind margin of the ninth sternum, and the V-shaped cleft of the posterior margin of ninth tergum.

Male.—Head: Rostrum well developed, as long as the head and longer than the antennae. Antennae eight-segmented, slightly yellowish tinged, most segments longer than wide and rather loosely joined. Compound eyes not divided by a transverse depression. *Thorax*: Mesonotum and scutellum chiefly rufous, anterior portion of dorsum black. Pleurae yellow-brown to blackish; humeral ridges largely yellow; halteres black, stems pale. All tarsi slender, posterior basitarsi not at all swollen, equal in length to the next four subsegments. *Wings*: Brownish yellow fumose, stigma slightly darker than the membrane. Anterior fork of Rs (R_3+_4) straight and almost vertical. Cubital cell widely open in the wing margin. *Genitalia*: Ninth strenum with a blunt median projection on the posterior margin, lateral margins not developed. Harpagones small, slender and rather sharply pointed, folded downward in normal position, scarcely visible from ventral view unless plate is tilted back. Ninth tergum broader than long with a deep V-shaped concavity on posterior margin.

Length: body, 6-6.5 mm.; wing, 7.5-8 mm.

Holotype male, Lombardia, Honduras (W. M. Mann); allotype female, Motzorongo, V. C., Mexico, Feb. 11, 1892 (H. Osborn). Eighteen paratypes, fifteen males, three females, from the following localities:

Honduras: same data as holotype.

Mexico: same as allotype; Cordoba, Feb. 24, 1908 (Fredk. Knab); and Teapa, Tabasco, Feb. (H. H. S.).

Holotype, allotype and seven paratypes returned to the United States National Museum; two paratypes being returned to the British Museum of Natural History; two will be returned to Deutsches Entomologisches Institute, Berlin, others are in the Snow Entomological Collection.

Plecia (Rhinoplecia) varabilis n. sp.

This species can be separated from *P. rufithorax* Walker only by the male genitalia; it is easily distinguished by the characteristic development of the ninth sternum and the small V-shaped cleft on the hind margin.

The rostrum is well developed, longer than the antennae, and folded beneath the face in resting position; compound eyes without a transverse groove on lower portion. Antennae of male eight-segmented, of female ten-segmented, antennae as well as pleurae and sides of abdomen often tinged with yellow. *Male genitalia*: Ninth sternum broad; posterior lateral margins strongly developed, reaching much beyond the bases of the harpagones. Hind margin of sternum with a characteristic knoblike development in the middle. Harpagones well developed, with several irregular teeth or bumps apically. Ninth tergum but little wider than long, hind margin with a small V-shaped excavation in the middle.

The specimens in the type series show considerable variation in color, the typical coloration being yellow-orange without maculations, varying to dark rufous with irregular dark spots. Some of the female specimens conform with the latter, but they appear to be slightly teneral, and this is probably not characteristic.

Length: body, 5-6.7 mm.; wing, 5.3-8.6 mm.

Holotype male and allotype female on same pin, Barro Colo. Isld., Canal Zone, Feb. 16, 1929 (C. H. Curran). Paratypes: seven males, six females same data as type; two females, one male, Paraiso, C. Z., Panama, Jan. 17, 1911 (E. A. Schwarz); three males, two females, same locality as type, Feb. 6, 1936 (F. E. Lutz, W. J. Gertsch); two females, Guatalon, Guat., May 4, 1931 (D. M. Bates).

Holotype, allotype and ten paratypes returned to the American Museum; three paratypes returned to the United States National Museum and two paratypes to Cambridge Museum of Comparative Zoology, others are in the Snow Entomological Collection.

NOTE

ANISOTA RUBICUNDA FABR. FORM *SPERRYAE* FORM. NOV.

Head, front, legs, underside of thorax and abdomen dark pink. Thorax above brownish pink. Abdomen above darker, with a more generous mixture of pink scales. End of abdomen buff above and below. Antennae same color as in normal male.

Wing form same as in normal male. Primaries above as in normal male when the basal area and outer margin are roseate, but the entire surface is overlaid with pink scales. The costa is deep pink in its entire length, and this dark color extends across the apex suggesting the male of *A. virginiensis* Dru. The normally yellow ocherous central portion of the wing is lighter pink, revealing the markings of the normal male.

The secondaries are entirely pink. The normal submarginal band is faintly indicated, and the disc of the wing is lighter pink where this color replaces the normal yellow shade.

Underside: Both wings with the basic markings of the normal male but overlaid with pink scales. The deep pink costa and the dark apical area of the upper side are reproduced below.

Holotype. Male, Lake Katherine, Wisconsin, May 28, 1939, in the collection of the author. Lake Katherine is in Oneida County five miles south of Minocqua.

The specimen doubtless represents a case of extreme melanism and differs so radically from the normal form in appearance that it seems desirable that it be named for future reference. I take pleasure in naming the form in honor of Mrs. Grace H. Sperry of Riverside, California, whose enthusiastic work with our western Lepidoptera has resulted in many interesting discoveries.

H. M. Bower,
Wausau, Wisconsin.

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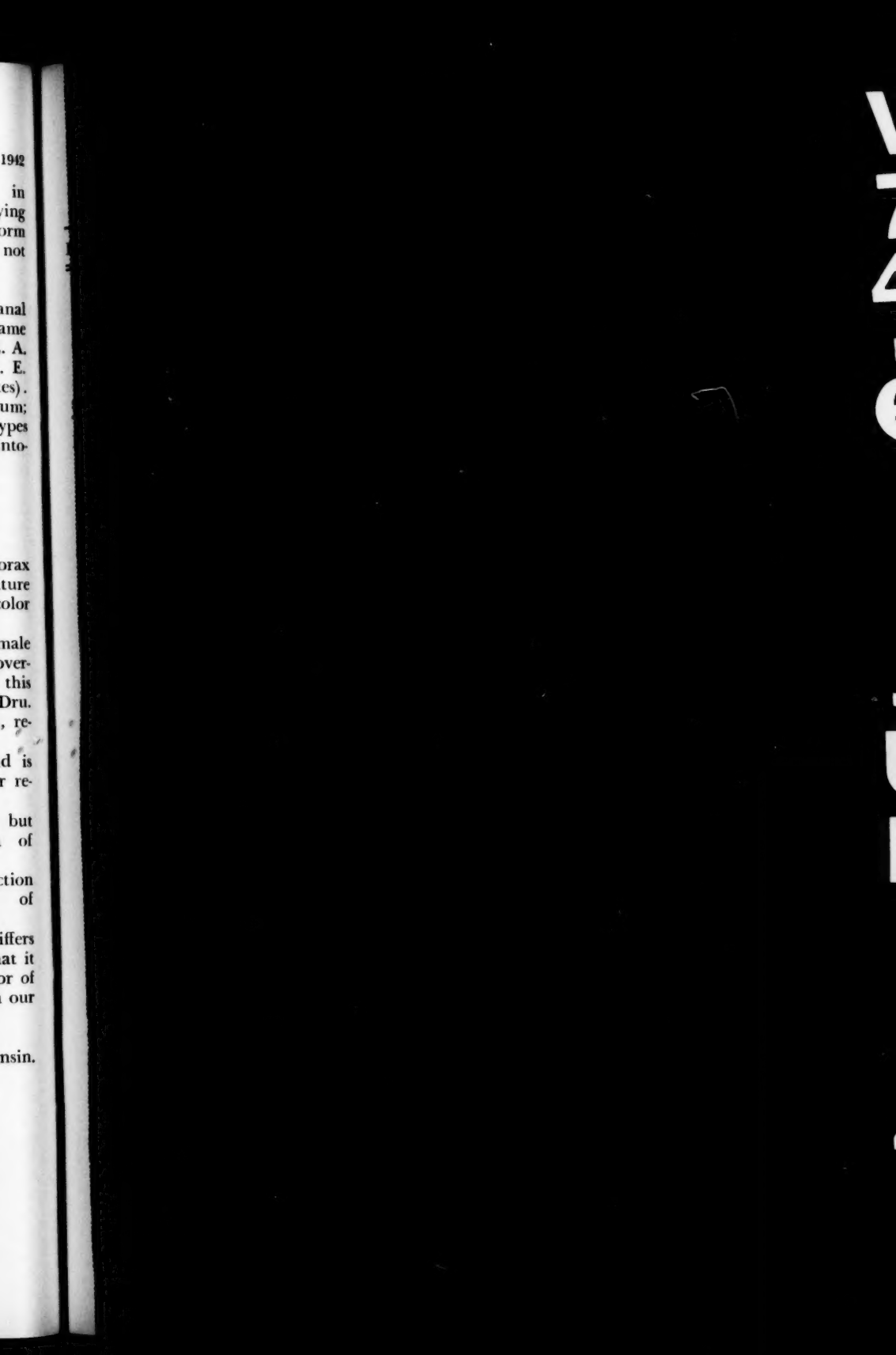
Mailed Thursday, July 9, 1942.